IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Debra D. Wawro Sorin Tibuleac Robert Magnusson	Group Art Unit: 2882 Examiner: Kao, Chih-Cheng G.
Serial No.: 09/707,435	Atty. Dkt. No.: UTSL:058US/MTG
Filed: November 06, 2000	
For: RESONANT WAVEGUIDE-GRATING FILTERS AND SENSORS AND METHODS FOR MAKING AND USING THE SAME	

DECLARATION OF ROBERT MAGNUSSON UNDER 37 C.F.R. § 1.132

I, Robert Magnusson, declare as follows:

1. I am one of the inventors of the above-captioned patent application.

2. I received a Ph. D. degree in Electrical Engineering from the Georgia Institute of Technology in 1976. I joined the faculty of the University of Texas at Arlington in 1984. There, I established instructional and research programs in optics and developed major experimental facilities in photonics and nanotechnology. I was Professor and Chair of the Department of Electrical Engineering at the University of Texas at Arlington during 1998-2001 and am presently Professor and Head of the Electrical and Computer Engineering Department at the University of Connecticut. I have served as a topical editor of Applied Optics and Optical Engineering and as general chair for the Diffractive Optics and Micro Optics 2002 topical meeting. With my students and colleagues, I have authored over 200 journal articles and conference papers. I am a Fellow of the Optical Society of America and SPIE (International Society for Optical Engineering). I am a recipient of the IEEE Third Millennium Medal and an elected member of the Connecticut Academy of Science and Engineering.

3. I have read the May 31, 2005 Office Action. I understand that the Patent Office believes that U.S. Patent No. 5,598,300 to Magnusson *et al.* ("'300 Patent") discloses a waveguide grating device that comprises at least one waveguide and a guided-mode resonance waveguide grating fabricated on an endface of the waveguide. This is not correct.

4. The Patent Office points to the multi-layer reflection filter shown in FIG. 1 of the '300 Patent and asserts that: (1) the homogeneous layer having a thickness of d_1 qualifies as the "at least one waveguide" recited in independent claims 1, 15, 35 and 38, and (2) the layers from "d_{n-1} to d_{n+1}" qualify as the guided-mode resonance waveguide grating recited in these independent claims. May 31, 2005 Final Office Action at page 3. These assertions reveal a fundamental misunderstanding about the FIG. 1 reflection filter disclosed in the '300 Patent.

5. The structure shown in FIG. 1 and described in the '300 Patent comprises an arbitrary number of unmodulated (homogeneous) and modulated (periodic) layers that are chosen according to the desired application for the resulting filter. *See* col. 2, lines 17-52 and col. 4, line 55 – col. 5, line 5. At the time the present application was filed, the FIG. 1 filter from the '300 Patent (like all the filters disclosed in the '300 Patent) was understood by those of ordinary skill in this art as a "guided-mode resonance waveguide grating device" or as a "waveguide grating device" as these terms have been used in the present application. In other words, the entire N-layer structure in FIG. 1 is a waveguide grating, and it will resonate at its design frequency or wavelength.

6. Removing one of the layers (such as the homogeneous layer having a thickness of d_1) from the FIG. 1 waveguide grating will deviate from the N-layer waveguide grating's design, and the device will no longer work as intended. The remaining layers will no longer function as the original waveguide grating, and may not necessarily function as any kind of waveguide grating.

7. In paragraph 4 of page 3 of the Final Office Action, the Patent Office points to the d_1 layer from FIG. 1 of the '300 Patent as showing a waveguide that is rectangular in shape. Even assuming for the sake of argument that the d_1 layer is a waveguide (which I do not concede),

there is nothing in FIG. 1 of the '300 Patent that requires that it be rectangular in shape. While the cross-section of the d_1 layer appears rectangular, the shape of the d_1 layer could still be cylindrical (or elliptical, hexagonal, etc.), which would be clear only from a top view that is not provided.

8. In paragraph 6 of page 4 of the Final Office Action, the Patent Office points to the d_1 layer from FIG. 1 of the '300 Patent as showing a grating layer and a waveguide layer that comprise the same layer. The d_1 layer is a homogeneous layer and, therefore, is not also a grating layer.

9. I understand that the Patent Office believes that U.S. Patent No. 5,891,747 to Farah ("Farah") discloses a waveguide grating device that comprises at least one waveguide and a guided-mode resonance waveguide grating fabricated on an endface of the waveguide. The Patent Office states on page 13 of the Final Office Action that "[a]lthough Farah does not specifically recite the term 'guided-mode resonance waveguide grating', the grating of Farah still has the structure that reads on a guided-mode resonance waveguide grating." This statement is incorrect.

10. The operation of the Farah embodiment shown in FIG. 4B is dependent on the redirection of incident light via grating 31 which yields diffracted orders other than the zeroth order. Col. 8, lines 31-52. Those diffracted orders are shown in FIG. 4B as 35, and they are necessary for the light to couple from one fiber end 1' to the other fiber end 1" across gap 4. In contrast, the guided-mode resonance waveguide grating that is claimed operates by eliminating such higher order waves, as explained in our application at page 16, lines 1-15. Furthermore, we distinguished diffraction gratings like those used in Farah from those that exhibit the guided-mode resonance effect in our application at page 3, lines 17-22. The Farah grating is simply not a guided-mode resonance waveguide grating, and no one of ordinary skill in this art would think otherwise.

11. I understand that the Patent Office has rejected claims 2 and 22 over the '300 Patent combined with U.S. Patent No. 6,488,414 to Dawes *et al.* ("Dawes"). The Patent Office states that "[i]t would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device and system of Magnusson et al. with the fiber of Dawes et al., since one would be motivated to make such a modification to send an optical signal over a longer distance with less signal loss." Final Office Action at p. 6.

12. It does not make sense to look at Dawes and the '300 Patent together for any reason. The claim 1 waveguide grating device and the Dawes collimator assembly function completely differently from each other, and are fabricated differently. The Dawes collimator assembly projects light to or from a fiber-lens device, and light proceeds in a transmission mode. Dawes is not concerned with monitoring a reflected signal or its spectral content, as is possible using the claim 1 waveguide grating device. The Dawes collimator assembly would never be used as a filter assembly, which is a possible application of the claim 1 waveguide grating device. If someone skilled in this art wanted to make a better beam collimator to optimize coupling from one waveguide to another, they would not use a guided-mode resonance waveguide grating from the '300 Patent.

13. Furthermore, the claim 1 waveguide grating device would not be used for spatial beam shaping or to optimize coupling from one waveguide to another, as the Dawes device would.

14. I declare that all statements made of my own knowledge are true and all statements made on information are believed to be true and further that the statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both under § 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this application or any patent issued on it.

Date: 11/30/05

Robert Magnusson